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PROBLEMS FACING FOREST MANAGEMENT IN THE CENTRAL ROCKY MOUNTAINS

by

Jesse H. Buell

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UNITED STATES DEPARTMENT OF AGRICULTURE
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PROBLEMS FACING FOREST MANAGEMENT IN THE CENTRAL ROCKY MOUNTAINS

By

Jesse H. Buell

Thank the Lord for the Rocky Mountains! If it were not for them there would be no meeting of the Society of American Foresters here today. There would be no trees, no cities for us to meet in, no problems in forest management to talk about.

For without the mountains we would be without moisture, left high on a windswept plain too dry for anything but cactus and sagebrush. This side of a line running near the eastern borders of the Dakotas, Nebraska, and Kansas, and splitting Oklahoma and Texas, potential evapotranspiration exceeds precipitation -- that is, lack of rain limits plant growth. The dryness deepens as you go farther west and does not let up until you are almost within shouting distance of the Pacific. Nowhere in our region, except in the mountains, is the annual precipitation more than 20 inches; in much of it, it is less than 15 inches; and in places, as low as 4 or 5. It is hard for the newcomer to realize how different this region is from the lush east; it was for me. Home grounds here are verdant and shaded, and at first I did not notice that I was always dodging lawn sprinklers incessantly spraying.

But listen to a paragraph or two of what Bernard De Voto[1] said to a graduating class at the University of Colorado a few years ago:

> We are desert-dwellers. The West is a desert. Colorado is a desert. A human society more complex than that of small migratory herders of sheep and cattle, a civilization higher than that of the Indian hunters who preceded us here, is possible only because of the snow that falls upon our peaks. We can meet here today, there are lawns on this campus, there is a University of Colorado, there is Boulder, there is Denver only because the stone fingers of the Rockies reach up to catch and hold the snow. We Westerners have carried the United States beyond the line where rain for crops falls off, where logic and the experience of the

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[1] De Voto, Bernard. The desert threat. Univ. Colo. Bull. 48, No. 18. Boulder, Colorado. 1948.

> Americans said civilization must stop, and we have maintained our society here, only because our land has mountains and water runs downhill. The West is a desert, and we have told ourselves, and God knows we have told the world, that we have made the desert blossom as the rose. We are telling the plain truth. But we would be wise to remember every moment that roses also blossomed in Mesopotamia and Syria and Tunis and Ur of the Chaldees -- and they are desert wastes now.

So much for De Voto. As he says, the mountains are our relief. About them are coolness and moisture. Their precipitous topography and quick contrasts help to put nature on edge in our region. Between the summit of Pikes Peak and the eastern edge of Colorado mean annual temperatures differ as much as between Iceland and Florida.[2] Rainfall in a valley may be 6 inches a year, and in the mountains less than 30 miles away, more than five times as much.[3]

Only in the mountains -- little more than 10 percent of our area -- are forests the natural vegetation. Elsewhere extraordinary pains must be taken to make trees grow for windbreaks, shelterbelts, and shade, and in many places they cannot be grown at all, except under irrigation.

Our natural forests are confined to the mountains that rise high enough to cool the moisture-laden winds and wring from them a sufficient precipitation. They are grouped into islands. The lower lands that interlace and encircle them are grass or brush-covered. Mountain peaks at the centers of some of the forest-islands rise so high that their tops are treeless because of the cold. That is to say, we have two timberlines. The lower one, due to lack of moisture, is at about 3,000 feet in South Dakota, and 6,000 feet farther south. The upper one, due to cold, is reached only in the main mass of the Central Rockies where the mountains reach above the critical elevation of 11,000 feet, more or less. So our forests form a ribbon some 5,000 feet deep vertically around the slopes of the mountains.

It is a striped ribbon. The top stripe, next to the alpine tundras, is spruce-fir forests. Just below is a zone of lodgepole pine, broad toward the north but pinching out this side of the New Mexico line. The next band is ponderosa pine. At the south it spreads out to take over where lodgepole pine stopped. Following along the foothills to the north, skipping here and there, it widens again to form the forests of the Black Hills in South Dakota. From the Black Hills down to Middle Colorado, ponderosa pine borders the brush and grasslands of the valleys and plains. Farther south, a belt of pinyon-juniper woodland is the bottom stripe.

2/ U. S. Dept. of Agr. Climate and Man. Yearbook of Agriculture, p. 807. 1941.

3/ Ibid., p. 798.

Our important commercial species can be counted on the fingers of one hand: Engelmann spruce, alpine fir, lodgepole pine, ponderosa pine, and Douglas-fir. Locally aspen is used for matches and excelsior, and everywhere is a big tourist attraction when the leaves turn gold in autumn. Minor species include blue spruce, white fir, limber, bristlecone, and pinyon pines, junipers, cottonwoods, and willows.

Engelmann spruce-alpine fir is a climax type, behaving here very much as spruce-fir types do throughout the continent; in fact, Oosting,[4/] comparing spruce-fir stands of the Medicine Bow Mountains in Wyoming with those of the Southern Appalachians, commented that they were so much alike that they smell and sound the same. Lodgepole pine is a pioneer type reproducing in dense even-age stands following major disturbances of the forest. It is not a climax, but acts like one where fire eliminates its competitors. In this regard it is much like the southern pines. Ponderosa pine is probably climax, although in the Black Hills at least, it often reproduces in dense even-aged stands over large areas following fire or windthrow. Douglas-fir has been little studied in this region, and its place in succession is not well known. As a type, it is not extensive or important compared to the others.

We have no exact figures on the acreages, volumes, or rates of growth of our timber. The Forest Survey has not yet covered Wyoming, Colorado, or Nebraska, and the original surveys of South Dakota and Kansas are 15 years old. Forest Service reappraisal figures for 1945 showed a stand of 44 billion board feet on 14 million acres of commercial forest land in Region 2 (Colorado, Wyoming east of the Continental Divide, South Dakota, Nebraska, and Kansas). Annual growth was estimated at 365 million board feet for the region. Average growth computed from these data is 26 board feet per acre per year. This low figure is due in part to the fact that nearly one-third of the area was classed as virgin. However, the growing season is short at high elevations -- at Fraser, near the Rocky Mountain Station's experimental forest, the frost-free period averages only 17 days a year. So we can hardly expect better than 100 to 150 board feet per acre per year for managed stands in the mountains.

Our timbers are not large. Mature spruce-fir stands may have a few trees 3 feet in diameter, but trees 2 feet and less are commoner. Heights rarely run over five 16-foot logs; three being more usual. Lodgepole pine is typically straight and slender. Mature trees may be 2 feet in diameter, but are usually less than 18 inches and run to three or four logs. Ponderosa pine in the old-growth stands of southern Colorado may go to 48 inches in diameter and six logs in height, but in the Black Hills where much of the larger virgin stuff has been cut, 28-inch four-log trees are big.

[4/] Oosting, H. J. and Reed, J. F. Virgin spruce-fir of the Medicine Bow Mountains, Wyoming. Ecological Monographs 22: 69-91. 1952.

Ours is not a region of large clear trees of rapid growth. In managed stands on rotations of from 100 to 200 years, medium-sized and somewhat knotty trees are probably the best that we can grow.

Dendroctonus engelmanni killed 4 billion board feet of Engelmann spruce in the high mesa country of Colorado between 1939 and 1952. We have other, but less dramatic, natural enemies of the forest: Dendroctonus ponderosae is our ponderosa pine, mistletoe in the lodgepole, and porcupines and wind indiscriminately, among them. Because most of our forests are filled with snow half the year and are moistened by mountain showers during the summer, fire is not so troublesome here as it is elsewhere.

In the Central Rockies we are just growing out of the pioneering stage. Our forest economics are certainly frontier economics. Ours is probably the last frontier forest in the United States. In the westward migration the Rocky Mountains were barriers to be passed over. Their forests were too inaccessible and too puny to be used except as a source of ties and fuel along the way for railroads pushing to the Pacific; certainly too insignificant to attract a lumber industry dazzled by the big trees of Oregon and Washington, and California. Even the forests of Alaska are ahead of us now, for they are getting pulpmills. But we shall have our day.

Our forests grow on steep land, snowbound much of the year. Not only are they remote in the mountains but are difficult and costly to log once they are reached by roads. Our logging and milling are very generally of the kind common to operations just on the edge of feasibility. Consequently, so much of our lumber is poorly sawn and dried that all local lumber is considered inferior here at home and has a hard time competing with lumber inherently no better, shipped in from areas whose large mills produce uniform, well-turned-out stuff.

Our annual cut of lumber now is about 200 million board feet. The growth of our forests, estimated at 365 million a year, could be doubled under more intensive forest management. So it is obvious that we are cutting far below sustained-yield capacity. A great deal of our timber is mature before it reaches sawtimber size; many more stands could be improved by thinnings that would take out 4-, 6-, and 8-inch trees; finally our 4 billion feet of standing bug-killed spruce has checked too badly to be used for lumber, but predictions are that it will be good for pulp for 30 years. So you can see we are ready for a brisk market in small products -- ties, posts, poles, and pulpwood. I am confident it will come -- eventually.

Most of our forest land is more valuable to the economy of the region for the water it yields than for its timber products and Mr. De Voto's warning is not to be forgotten. But in our high mountains most of the precipitation is snow. In dense coniferous forests a good share is held on the tree branches and is lost by evaporation into the air. Here timber cutting may actually increase water yield. The trick is to cut and log without increasing erosion or decreasing the absorptive power of the soil.

Recreation must not be overlooked, either. There is no great conflict between timber harvesting and recreation yet, but good planning will certainly be needed to avoid it in the future.

What, then, are the problems facing forest management in the Central Rocky Mountains? In spruce-fir, here as elsewhere, we have the controversy over even-aged management *versus* all-aged management that was aired in a symposium at the Montreal meeting last year. In our overmature old-growth spruce there is little choice but to make the first cutting a patch or strip clearcutting. But how wide a patch will seed in and reproduce adequately? If slash needs to be gotten rid of to decrease fire hazard, how can it be done with least harm silviculturally?

Clearcutting seems to suit lodgepole pine best, but what can we do to avoid too-dense reproduction? And what is the best schedule of intermediate cutting to keep the new stand growing?

Ponderosa, especially on national forests in the Black Hills, has been under management for 50 years. Now we are ready to use more intensive silviculture. The shelterwood system is to be tried, and problems of its application will need to be solved.

As for the shelterbelts, there is some question whether the first-priority problems are in the field of forestry or of influences. After all lingering doubts of the effectiveness of shelterbelts have been allayed, there will be plenty of questions for the silviculturist: about species, spacing and arrangements, nursery and planting practices, and plantation management.

Then, there is the continuing problem of forest protection: from wind, fire, insects, and diseases. And always before us is the necessity of handling our forests so as to maintain or enhance the yield of good water from them.

We need an inventory of our forest resources. Without it we can do no accurate planning.

But since we manage forests only so that the trees may be used, our most important problems are in the field of forest products utilization. How can we improve logging and milling methods so that we shall have good lumber to sell at reasonable prices? How can we develop new uses for our particular kinds and sizes of trees? The really big question is, of course, how shall we attract the markets?

I feel sure that the forests of the Central Rockies will in the future increase in importance as producers of timber. The many changes since the days when our accessible timber was passed up and despised, and the high-mountain forests were thought to be as remote as the moon, point to more changes to come. We are a fast-growing region. Only the Pacific Coast states, and two or three in the east, have beat the Central Rocky States in population increase over the last decade.[5] Outside our region, timber is getting scarcer all the time.

Let us improve our logging and milling methods and our silviculture, and we can supply most of our own lumber needs. Over and above that we shall certainly be able to grow a continuing supply of pulpwood and small products for processing here, or for export, as economics may dictate. So I say, give us time, and forest management in this region will come into its own.

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[5] U. S. Dept. of Commerce, Bureau of the Census. Statistical abstract of the United States, 1951. p. 4.